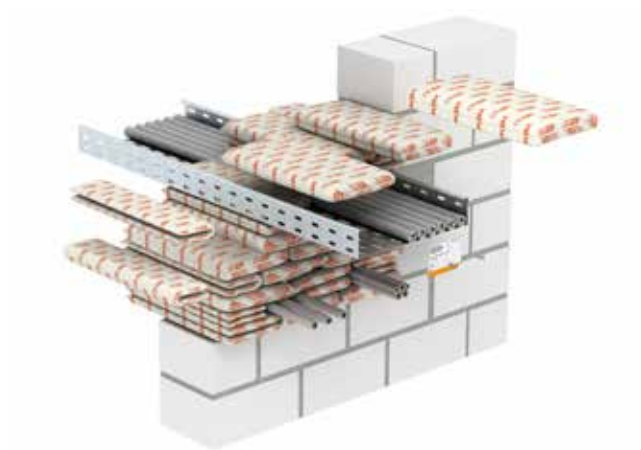


PYROBAG® System
Cable insulation with fire protection
cushions

Mounting instructions



PYROBAG® system, cable insulation with fire protection cushions

Mounting instructions

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1 About these instructions

1.1 Target group

These instructions are aimed at installation engineers trained in fire protection.

1.2 Relevance of these instructions

- These instructions are based on the standards valid at the time of compilation (June 2023).
- All the documents supplied with the product must be stored in an easily accessible location, so that they remain available when information is required.
- We will not accept any warranty claims for damage caused through non-observance of these instructions.
- Any images are intended merely as examples. Mounting results may look different.
- In these instructions, cables and lines are referred to simply as cables.
- To find out more about planning and mounting the product, we recommend a comprehensive training course.

1.3 Types of warning information



Type of risk!

Shows a possibly risky situation. If the situation is not avoided, then death or serious injury may result.



Type of risk!

Shows a possibly risky situation. If the situation is not avoided, then light or minor injury and property damage may result.

Note!

Indicates important information or assistance

1.4 Intended use

PYROBAG® is an insulation system for building interiors. The main components of the system are fire protection cushions. They close openings in fire-resistant walls or ceilings, through which cables and/or cable support systems are run. They also enclose open spaces in cable ducts that are routed through fire-resistant walls. The PYROBAG® insulation system prevents the spread of fire and smoke in the area of the penetration. With this system, a fire resistance period of up to 90 minutes can be achieved. The fire protection cushions are suitable for interior rooms with and without a moisture load.

The insulation system is not designed for any other purpose than the one described here. If the system is installed and used for another purpose, any liability, warranty or damage claims shall be rendered null and void.

The cable insulation is suitable for the application areas described in these installation instructions. For other areas of application, the applicability must be verified separately.

1.5 Applicable documents

- General construction type approval Z-19.53-2570
- European Technical Assessment ETA-18/1069

- Declaration of performance 05-DOP-013
- "PYROBAG®" safety data sheet

1.6 Basic standards and regulations

- EN 1363-1:2020: Fire resistance tests – Part 1: General requirements
- EN 1366-3:2022: Fire resistance tests for service installations – Part 3: Penetration seals
- EN 13501-2:2010: Fire classification of construction products and building elements – Part 2: Classification using data from fire resistance tests

1.7 Basic safety information

The following basic safety instructions and information on handling PYROBAG® must be observed:

- The insulation made of PYROBAG® fire protection cushions is not suitable for improving the stability of a wall or ceiling. Ensure that the wall or ceiling is sufficiently stable, despite the opening, without the application of fire insulation.
- The installation of the fire insulation may not compromise the stability of the adjacent elements – even in the event of a fire. Consult the proof of application of the component.
- Cable support systems must be installed on the surrounding structure according to the relevant regulations. They must not put any additional mechanical load on the insulation in the event of fire.
- If ceiling insulation is created, the producer of the ceiling insulation must inform the responsible customer or building owner in writing that the ceiling insulation must be protected against loads and being walked on. A safety fence or grated cover, for example, must be installed for this purpose.
- Insulation areas in ceilings must be secured against being walked on even during installation.
- The fire resistance period of the insulation can be no higher than the fire resistance class of the wall or ceiling in which the insulation is installed.
- All the appropriate regulations and technical regulations of other units, in particular those for electrical engineering, must be complied with.
- Observe the safety data sheets of the products, which can be obtained online at www.obo-bettermann.com.

2 PYROBAG® product description

2.1 Basic principles

Fire insulation maintains the fire sections, thus limiting the spread of fire and smoke, and simplifying rescue and extinguishing work.

The PYROBAG® insulation system is designed for fire insulation in wall and ceiling openings and for insulation in cable ducts, and offers the following characteristics:

- Insulation from fire protection cushions
- Creation of cable insulation in solid walls, solid ceilings and lightweight partitions (LTW)
- Fire insulation of electrical cables, cable bundles and cable support systems in walls and ceilings
- Fire insulation of electrical cables and cable bundles in cable ducts
- Prevention of the spread of fire and smoke gas over a period up to 90 minutes (fire resistance class EI90, fire resistant)
- Exterior cushion material made of mineral fibre- and dust-free glass fabric, intumescent filling material
- Very well suited to temporary insulation, as it is easy to install and remove
- Can be reused multiple times
- Application in interior rooms with and without moisture
- Easy retrofitting possible
- Possible to fit as empty insulation without installations
- Cushions in three different thicknesses and widths for different sized (intermediate) spaces

2.2 System components

The PYROBAG® insulation system consists of the following system components:



Fig. 1: Fire protection cushion

PYROBAG® fire protection cushion

KBK-1 350x120x10	Item no. 7202 70 9	VE 5 units
KBK-2 350x170x23	Item no. 7202 72 5	VE 5 units
KBK-3 350x170x40	Item no. 7202 74 1	VE 5 units

2.3 Accessories

The PYROBAG® insulation system is processed and installed with the following accessories:

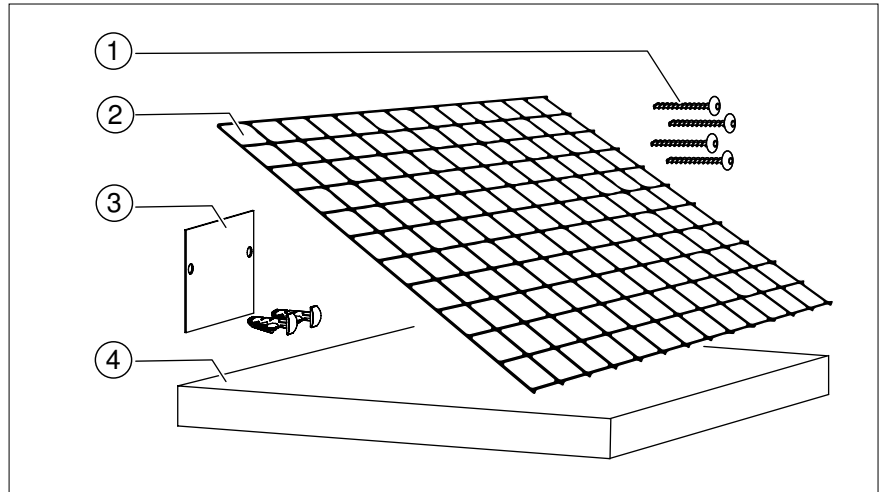


Fig. 2: Accessories

Figure no.	Designation	Article number	Packaging unit
①	Bolt tie MMS-plus 7.5x50 for steel wire grid	3498 26 1	100 units
②	Steel wire grid SDG-1 Steel wire grid SDG-2	7202 96 3 7202 97 1	1 unit
③	Identification plate KS-S (DE, SE, ES, EN, HR)	7205 42 5/6/7/9 7205 43 8	1 unit
④	Calcium silicate board KSI-P1 500x150x20 Calcium silicate board KSI-P2 500x250x30 Calcium silicate board KSI-P3 1000x250x30	7202 28 3 7202 90 4 7202 91 2	1 unit

Tab. 1: Accessories

2.4 Recommended tools

We recommend a few flat, deburred sheets (approx. 500 x 250) for the installation of the PYROBAG® system, in order to be able to fit the fire protection cushions tightly.

3 PYROBAG® installation conditions

To ensure proper functioning of the PYROBAG® insulation system, installations and installation locations must fulfil technical and structural requirements.

3.1 Basic preconditions

- Cables and cable bundles must be fastened on the cable trays and ladders or in support structures according to the technical rules.
- Cable trays and ladders can be made of steel, aluminium or plastic profiles. The essential parts of the fastenings and supports of the cable support systems must be non-combustible.
- Cable support systems and cable ducts must be fastened in such a way on both sides of the fire insulation that, in the event of fire, no additional mechanical load can impact on the fire insulation for the length of the required fire resistance class. The technical regulations and specifications of the manufacturer of the cable support system and the fastening system must be complied with.
- To ensure functioning of the insulation, the total cross-section of the installations must not exceed 60% of the wall/ceiling opening or the cable duct cross-section.

3.2 Approved installation locations

The PYROBAG® insulation system and the cable duct with internal insulation can be installed in the following components:

Components	Component thickness in mm	Classification of the component	Fire resistance of the component
Solid walls			
Masonry concrete, reinforced concrete, porous concrete	≥ 100	DIN 1053-1 DIN 1045 DIN 4166	90 minutes
Lightweight partitions (LTW) in stand-off design with steel structure and planking	≥ 100	DIN 4102-4 or according to general construction test certificate (abP)	90 minutes
Solid ceilings			
Concrete, reinforced concrete	≥ 150	DIN 1045	90 minutes
Porous concrete		DIN 4223	

Tab. 2: Overview of approved installation locations

In solid walls and ceilings, formwork pipes may be inserted that are flush with the component surface.

3.2.1 Lightweight partition design:

If the insulation or cable duct with internal insulation is installed in a lightweight partition, the lightweight partition must be designed as follows, or meet the following requirements:

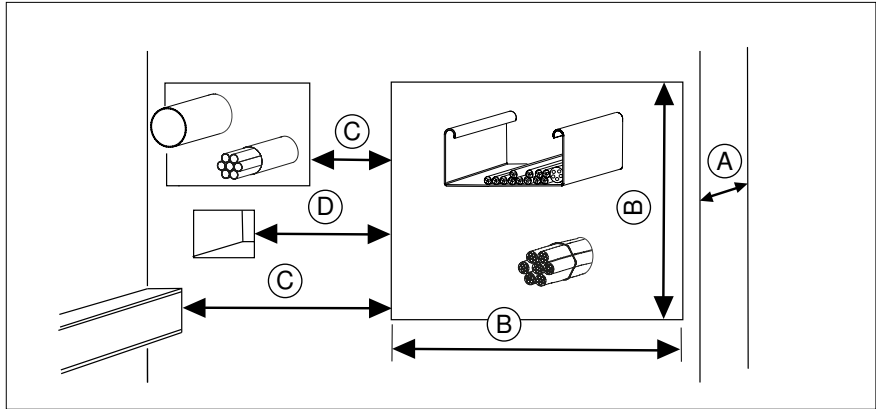
- Thickness ≥ 100 mm
- Stand-off design with steel sub-construction
- Panelling of at least 25 mm on both sides, made of gypsum plasterboard fire protection boards or non-combustible cement- or gypsum-bonded building boards
- With internal, panel-shaped insulation made of mineral fibre insulation material, ≥ 40 mm (material class DIN 4102-A, melting point $\geq 1,000$ °C according to DIN 4102-17, raw density ≥ 100 kg/m³)
- Maximum air gap of 10 mm between insulation and planking
- Fire resistance class F90 according to DIN 4102-4, proven with a general construction test report
- For component openings $\geq 300 \times 300$ mm, additional transoms and wall studs must be installed to form the side of the insulation (not applicable for cable duct)
- For component openings $\leq 300 \times 300$ mm, the side must be designed as followed (not applicable for cable duct):
 - Without wall insulation: Opening reveal is created like the wall panelling
 - With wall insulation: Opening reveal is created with non-combustible construction boards ≥ 12.5 mm (plasterboard fire protection boards, gypsum fibre or calcium silicate boards)

3.2.2 Cable duct versions

Joints between the component side and the cable duct must be completely filled to the thickness of the building component with dimensionally stable, non-combustible (material class, e.g. according to DIN 4102-A) building materials, such as concrete, gypsum or cement mortar.

3.3 Approved insulation dimensions and distances to other component openings

When installing the PYROBAG® insulation system and cable ducts with internal insulation, the following dimensions must be observed:



Dimensions and distances Dimensions in mm		
Dimensions in mm		
Ⓐ	Component thickness in walls	≥ 100
	Component thickness in ceilings	≥ 150
Ⓑ	Maximum dimensions of the component opening (width x height) in solid walls	1,000 x 1,500
	Maximum dimensions of the component opening (width x height) in lightweight partitions	1,000 x 1,000
	Maximum dimensions of the component opening (width x height) in solid ceilings	600 x unlimited
Distance to other cable or pipe insulation or cable ducts in mm		
Ⓒ	One/both opening(s) > 400 x 400 mm	≥ 200
	Both openings ≤ 400 x 400 mm	≥ 100
Distance to other openings or installations in mm		
Ⓓ	One/both opening(s) > 200 x 200 mm	≥ 200
	Both openings ≤ 200 x 200 mm	≥ 100

Tab. 3: Permitted dimensions and insulation distances

3.4 Approved installations

3.4.1 In wall and ceiling insulations:

The total allowable cross-section of the installations must not exceed 60% of the wall/ceiling opening.

The following installations are permitted with the PYROBAG® insulation system in walls and ceilings:

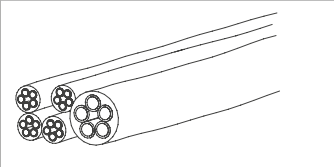
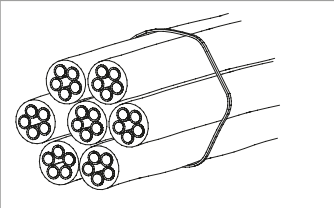
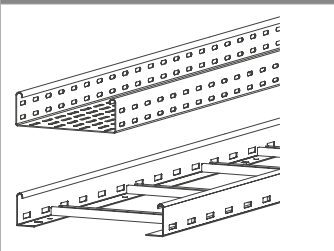
Cables	
	<ul style="list-style-type: none"> – Electrical cables of all kinds, including fibre-optic cables, but not hollow waveguides – Unlimited core cross-section in cables up to max. 80 mm outer diameter
Cable bundles	
	<ul style="list-style-type: none"> – Total bundle diameter ≤ 150 mm made up of separate cables with outside diameter ≤ 21 mm – No surrounding filling is necessary if cable bundles consist of tightly packed, firmly tied, sewn or welded parallel-running cables.
Cable support systems	
	<ul style="list-style-type: none"> – Cable trays and ladders made of steel, aluminium or plastic profiles

Fig. 3: Approved installations in walls and ceilings

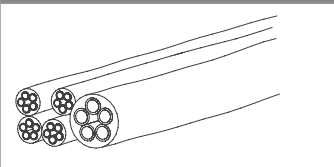
3.4.2 In cable ducts with internal insulation

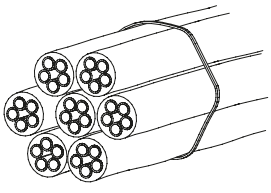
The insulation can be installed in cable ducts made of PVC or sheet steel.

- PVC duct: ≤ 210 x ≤ 80 x ≤ 3.5 mm
- Sheet steel duct: ≤ 100 x ≤ 210 x ≤ 2.0 mm

The total cross-section of the installations must not exceed 60% of the cable duct cross-section.

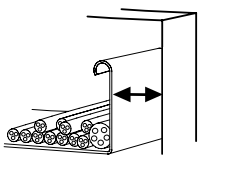
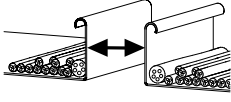
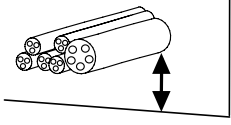
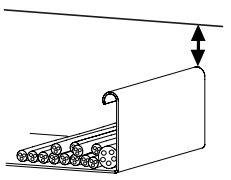
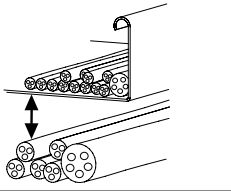
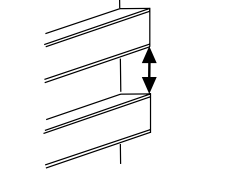
The following installations are permitted with the PYROBAG® insulation system in cable ducts:

Cables	
	<ul style="list-style-type: none"> – Electrical cables of all kinds, including fibre-optic cables, but not hollow waveguides – ≤ 20 mm outside diameter of the separate cables

Cable bundles	
	<ul style="list-style-type: none"> – Total bundle diameter ≤ 150 mm made up of separate cables with outside diameter ≤ 20 mm – No surrounding filling is necessary if cable bundles consist of tightly packed, firmly tied, sewn or welded parallel-running cables. – Cable bundles may be routed unopened through the internal insulation

Tab. 4: Installations in cable ducts with internal insulation

3.5 Minimum distances between installations

Distances of installations	mm
	<p>Lateral distance of cable support systems and cable layers to component side</p> <p>≥ 0</p>
	<p>Distance between cable support systems and cable layers next to each other</p> <p>≥ 50</p>
	<p>Distance below cable support systems and cable layers to component side</p> <p>≥ 15</p>
	<p>Distance above cable support systems and cable layers to component side</p> <p>≥ 50</p>
	<p>Distance between cable support systems and cable layers</p> <p>≥ 50</p>
	<p>Distance between cable ducts above each other</p> <p>≥ 100</p>

Tab. 5: Minimum distances between installations

3.6 First support in walls

Installations in walls must be supported so that the insulation is not mechanically overloaded in the event of fire.

The supports of the installation must be non-combustible (material class DIN 4102-A).

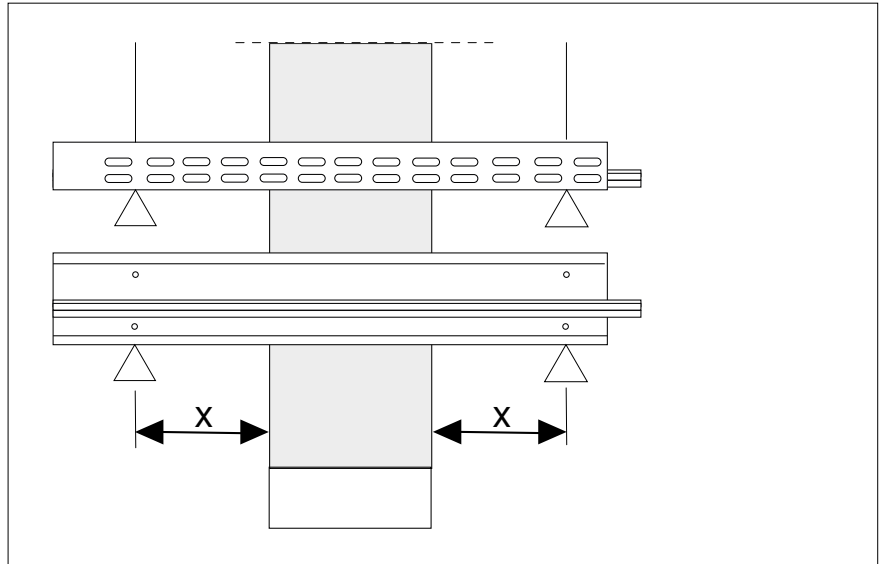


Fig. 4: Maximum distance for supports

The first support must be installed at a distance of $x \leq 150$ mm on both sides of the insulation.

4 Necessary preparations

4.1 Preparations for insulation in walls/ceilings

Lightweight partitions:

- For a thickness ≤ 200 mm, an additional support made of calcium silicate board KSI-P with a width of 250 mm x thickness 30 mm must be installed in the lower horizontal opening reveal.

Solid walls:

- For a thickness ≤ 200 mm, an additional support made of calcium silicate board KSI-P with a width of 250 mm x thickness 30 mm must be installed in the lower horizontal opening reveal.

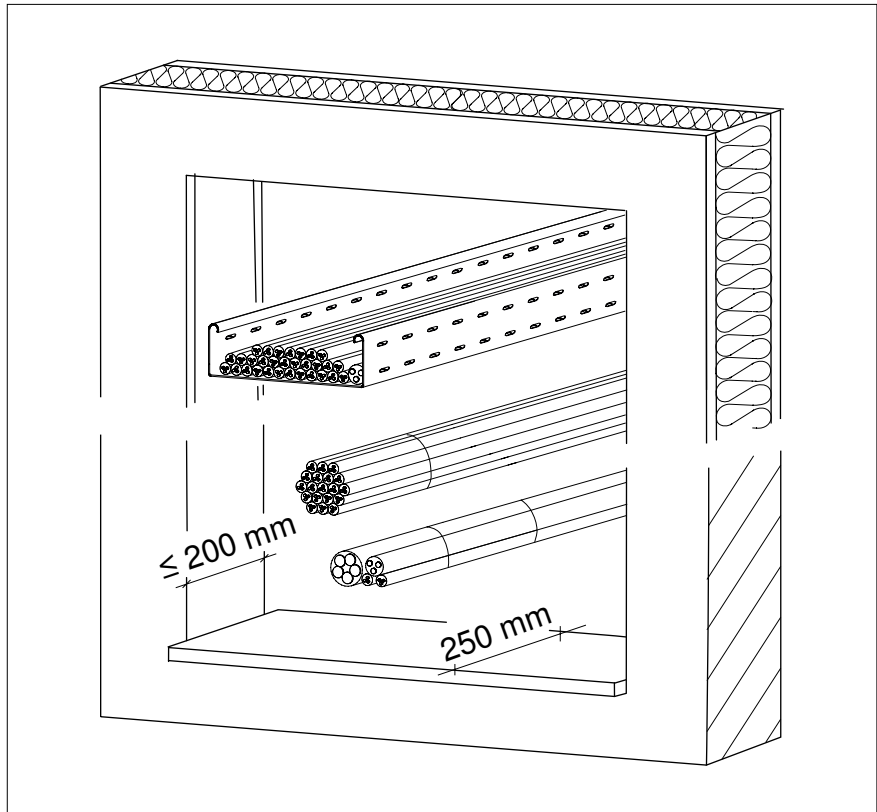


Fig. 5: Additional support in the lower horizontal opening reveal

Ceilings

- For ceiling insulation, a steel wire grid SDG with bolt ties MMS-plus 7.5x50 must be installed on the underside of the ceiling opening.

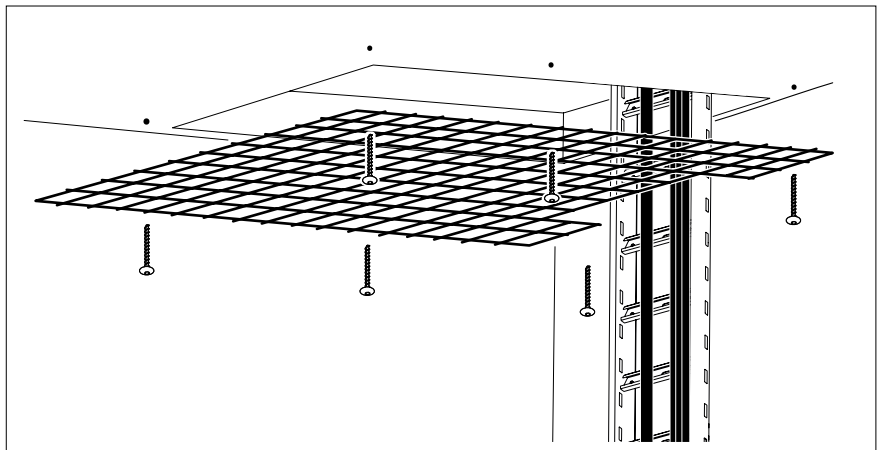


Fig. 6: Steel grid under ceiling opening

Cable support systems

- Steel sheet or aluminium hollow profiles must be drilled in the area of the insulation and completely filled with insulation layer creator DSX.

4.2 Preparations for insulation in cable ducts

If cable ducts are routed through the ceiling, brackets must be fitted inside the cable ducts in the area of the underside of the ceiling, so that the fire protection cushions do not fall out.

- PVC bracket (40 mm x 40 mm x 15 mm x 2 mm) in ducts made of

- plastic, mount with PVC adhesive or anchors
- Sheet steel bracket (40 mm x 40 mm x 15 mm x 1 mm) in ducts made of metal, mount with self-tapping screws ($\varnothing \geq 3$ mm) or anchors

Number of brackets	
Duct width	
40–50 mm	At least 1 unit.
51–100 mm	At least 2 units.
101–140 mm	At least 3 units.
141–210 mm	At least 4 units.

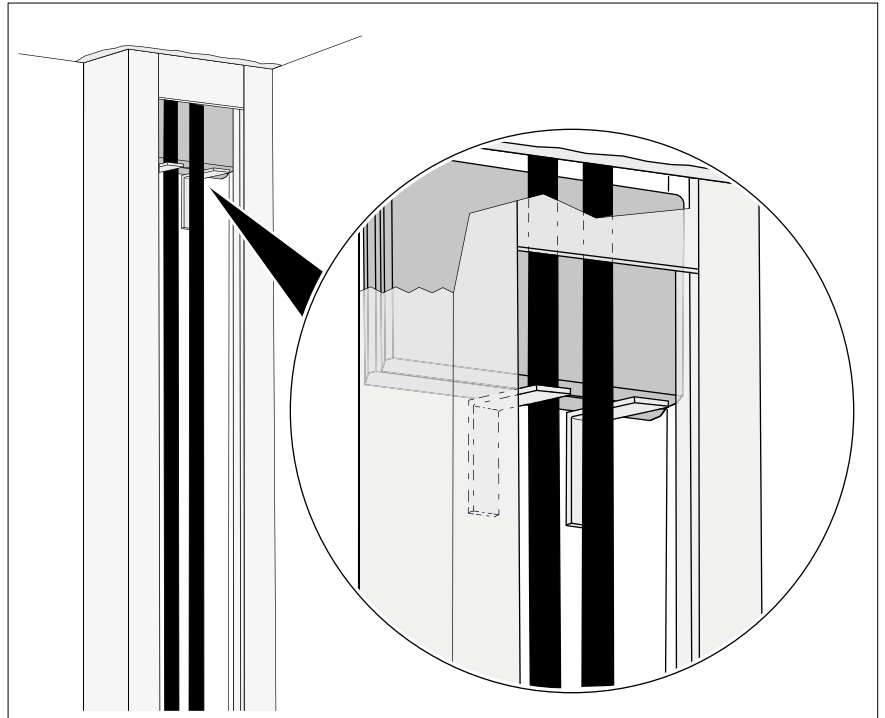


Fig. 7: Bracket in cable duct with ceiling penetration

5 Creating insulation

5.1 Creating cable insulation in walls

Note! *Gaps must be avoided. Any gaps that may occur do not have to be sealed if the cables are laid parallel and close together, and in a maximum of two layers or are combined into a cable bundle.*

- Establish installation conditions according to chapter 3 "PYROBAG® installation conditions" on page 8.

The insulation must be tightly packed with fire protection cushions as follows:

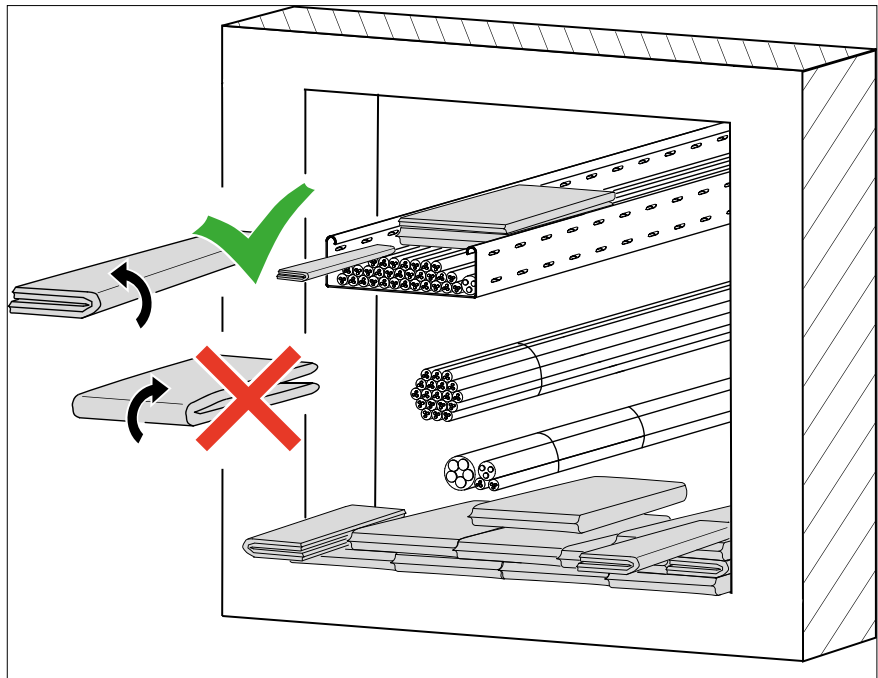


Fig. 8: Arrangement of fire protection cushions in wall opening

- Install fire protection cushions horizontally.
- Only install fire protection cushions at right angles to the wall reveal in order to utilise the cushion length of 350 mm.
- If necessary, fold the fire protection cushions lengthwise only.
- If possible, place fire protection cushions around cables or cable bundles, making sure that the material in the cushions is evenly distributed.
- Install layers of fire protection cushions overlapping (in the middle).
- Install fire protection cushions tightly next to each other and on top of each other.
- Use different cushion sizes for different sized intermediate spaces. (Figure)
- Also fill small gaps.

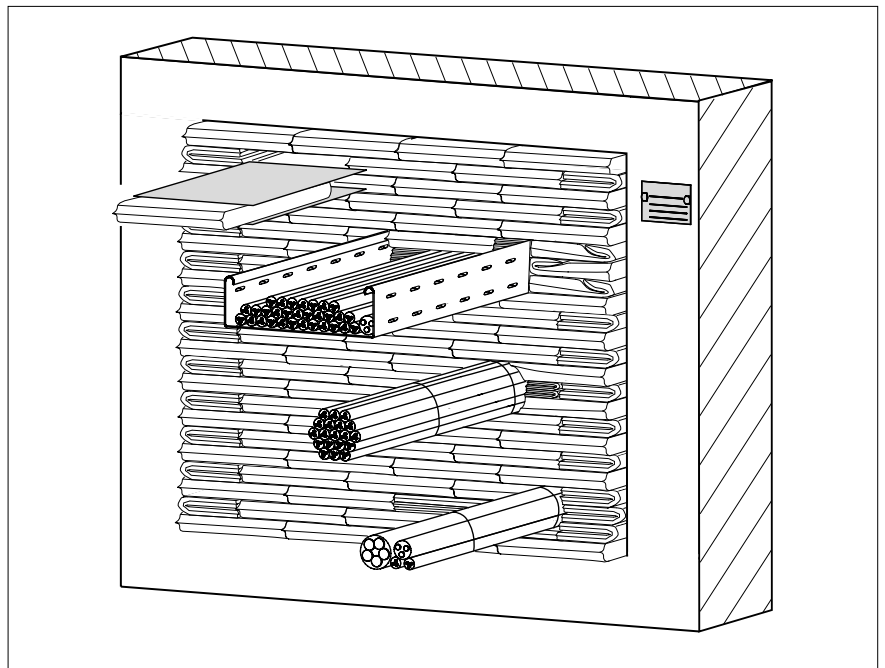


Fig. 9: Filled wall insulation

- Completely fill/stuff the component opening around and between the installations.

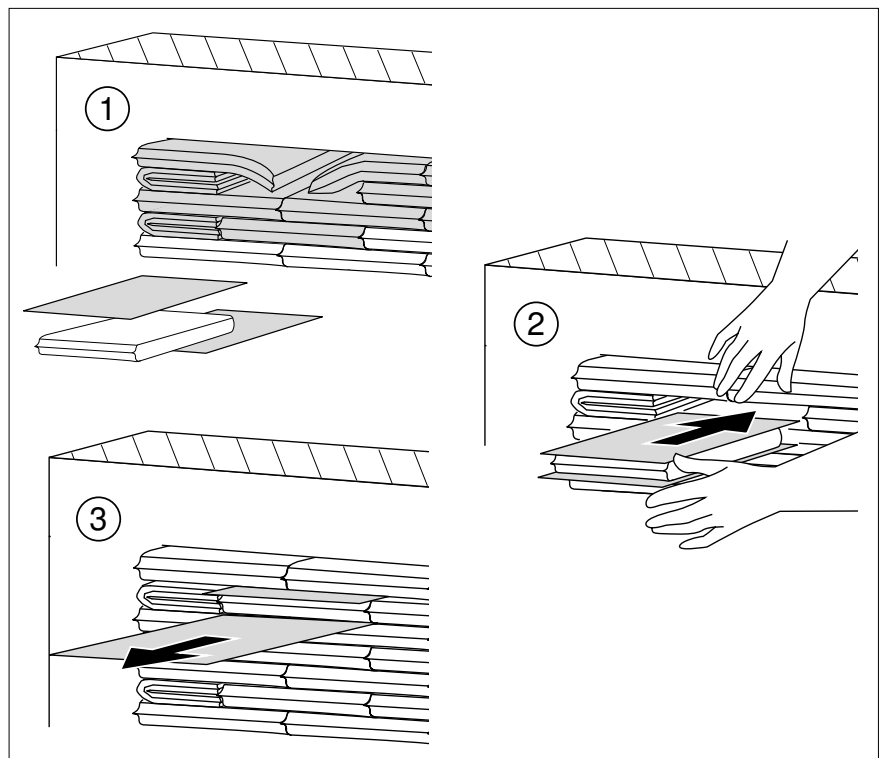


Fig. 10: Insert the last cushion layer with steel plates

- Insert the last layer using two flat, smooth, deburred steel plates. Then pull the plates out again.
- Using a torch or on a darkened side of the room, check that no light is shining through and that the insulation is packed tightly.
- Protect the insulation against unauthorised access by using a grated cover or safety fence.
- Fill out and attach the identification plate next to the insulation.

5.2 Creating cable insulation in ceilings



Risk of falling!

Fire insulation in ceilings can give way if subjected to loads or walked upon. Breakthroughs or falls can lead to serious or even fatal injuries. Cover the insulation permanently with a grated cover or install a safety fence.

Note!

Individual gaps between cables do not have to be sealed if the cables are laid parallel and close together, and in a maximum of two layers.

- Establish installation conditions according to chapter 3 "PYROBAG® installation conditions" on page 8.

The insulation must be filled with fire protection cushions in a smoke-gas-tight manner, as follows:

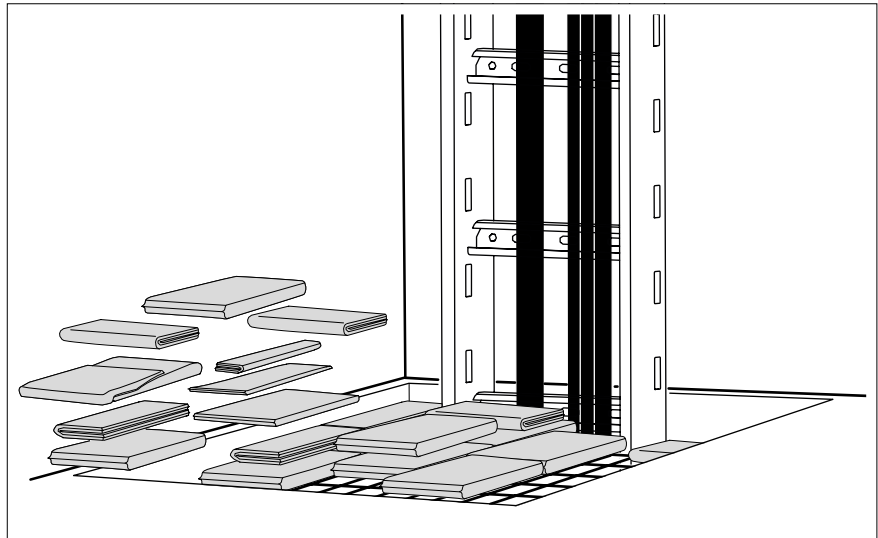


Fig. 11: Fire protection cushions on steel grid

- Install fire protection cushions horizontally.
- If necessary, fire protection cushions can be folded lengthwise or crosswise, but take care to ensure that the material is evenly distributed in the cushions.
- Install layers of fire protection cushions overlapping (in the middle).
- Install fire protection cushions tightly next to each other and on top of each other.
- Use different cushion sizes for different sized intermediate spaces.
- Also fill small gaps.
- Completely fill/stuff the component opening around and between the installations.
- Install fire protection cushions to a minimum height of 350 mm.

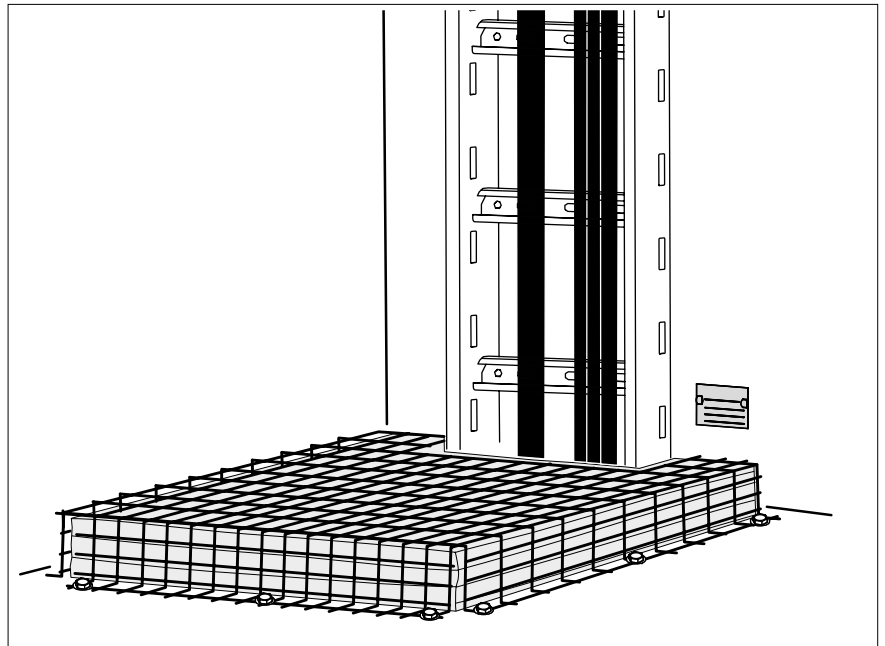


Fig. 12: Completed ceiling insulation with safety device

- Using a torch or on a darkened side of the room, check that no light is shining through and that the insulation is packed tightly.
- Protect the insulation against being walked on or unauthorised access by using a grated cover or safety fence.
- Fill out and attach the identification plate on the wall next to the insulation or with cable ties on the grated cover.

5.3 Creating cable insulation in cable ducts

Note! *Gaps must be avoided. Any gaps that may occur do not have to be sealed if the cables are laid parallel and close together, and in a maximum of two layers or are combined into a cable bundle.*

- Establish installation conditions according to chapter 3 "PYROBAG® installation conditions" on page 20 "PYROBAG® installation conditions" on page 8.

The insulation in the duct must be filled with fire protection cushions in a smoke-gas-tight manner, as follows:

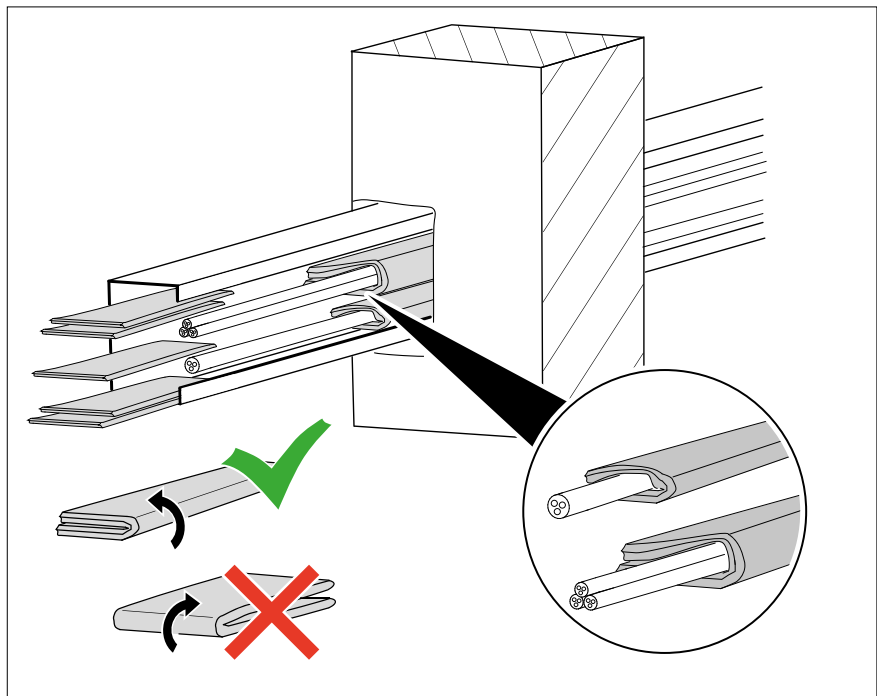


Fig. 13: Fire protection cushions in cable duct

- Install fire protection cushions horizontally.
- Install fire protection cushions centrally in relation to the building structure.
- Install fire protection cushions over a length of at least 350 mm.
- If necessary, fold the fire protection cushions lengthwise only.
- Use different cushion sizes for different sized intermediate spaces.
- Surround the cables and cable bundles with the fire protection cushions.
- Tightly pack at least one layer of fire protection cushions between cables and cable layers as well as between cables and cable duct walls.
- Install fire protection cushions tightly next to each other and on top of each other.
- Also fill small gaps.
- Using a torch or on a darkened side of the room, check that no light is shining through and that the insulation is packed tightly.

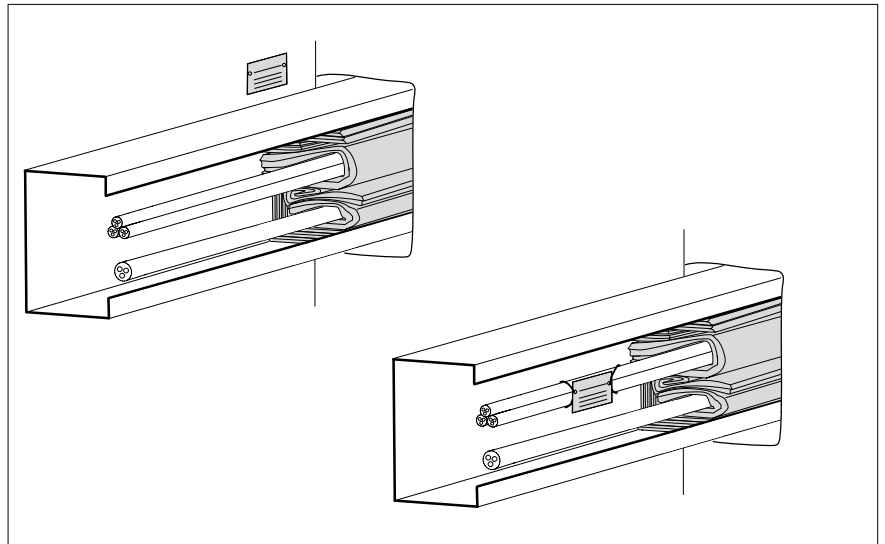


Fig. 14: Cable duct labelling

- Fill out and attach the identification plate on the wall with cable ties to the cables.

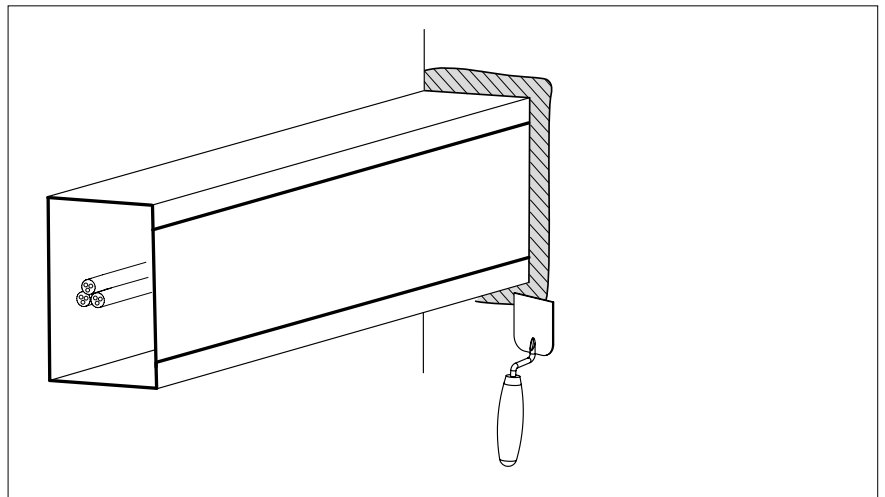


Fig. 15: Joint closure

- Close the cable duct.
- Seal the joints between the component side and the cable duct along the entire length of the insulation with commercially available non-combustible plaster or mortar.

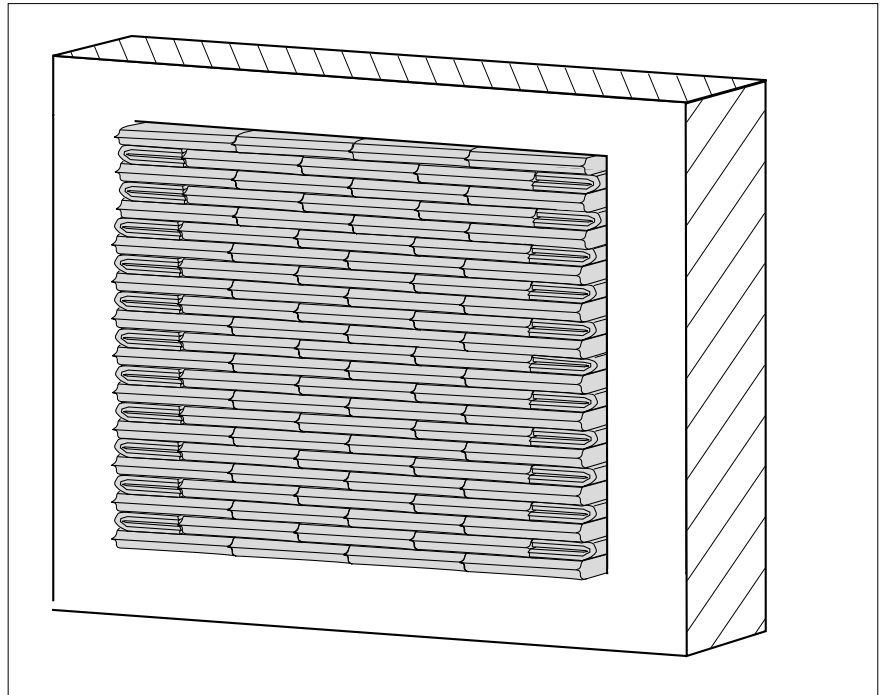
Note!

PVC sheathing can remain in the penetration opening. The installation of the cushions is done in the same way as for ducts.

5.4 Creating empty insulation

The PYROBAG® fire protection cushions can be used to create empty insulation areas for subsequent installations.

- Establish installation conditions according to chapter 3 "PYROBAG® installation conditions" on page 8.



- Install fire protection cushions according to chapter 8 "Appendix – declaration of conformity (sample)" on page 25.

5.5 Filling insulation at a later date

If insulation is filled at a later date, the contents of these mounting instructions must be taken into account.

- 1) Remove cushions from the insulation.
- 2) Position installations.
- 3) Reinstall fire protection cushions, according to chapter 5 "Creating insulation" on page 16.

6 National requirements

Note! *When mounting the system outside Germany or Austria, comply with other country-specific requirements that exist in addition to the national construction law.*

Germany/Austria

- The insulation system must be permanently labelled with a sign next to the insulation.
- The technically correct creation of insulation can be learned on a training course. Proof of training can be obtained through successfully participating in a training course at OBO Bettermann.
- After work has been completed, the client must be presented with a written declaration of conformity (see Chapter 8 "Appendix – declaration of conformity (sample)" on page 23 "Appendix – declaration of conformity (sample)" on page 25).

7 Disposal

National laws and regulations must be observed for disposal.

Disposal during mounting

- Any unused cushions can be retained for future use. Otherwise, residual material and packaging of the PYROBAG® system components and its accessories must be disposed of as mixed construction waste.

Disposal during building demolition

- Installed fire protection cushions can be reused, as long as they are not damaged. Otherwise they must be disposed of as mixed construction waste.

Disposal after a fire

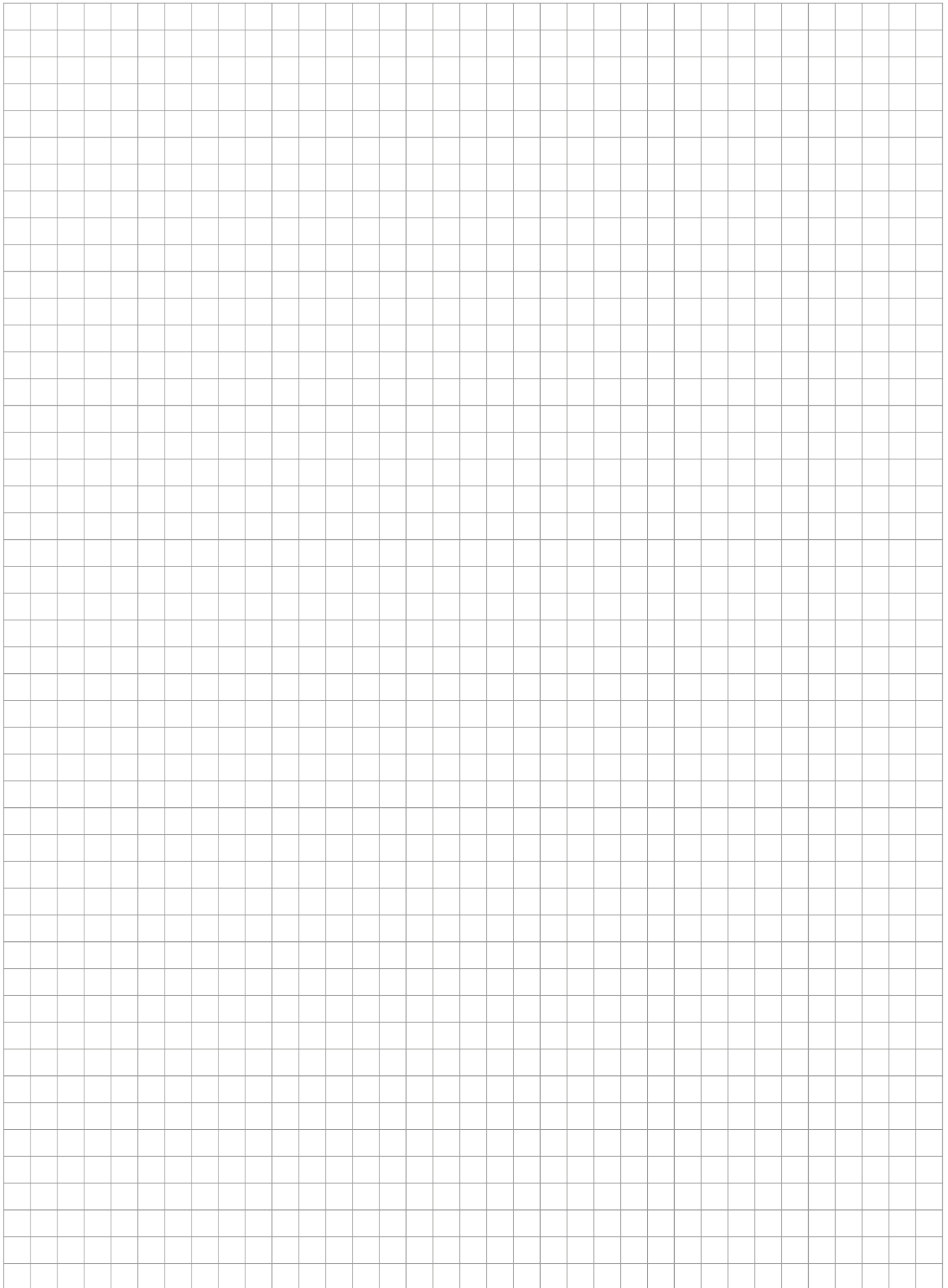


Caution: Irritant effect!

If there is a fire, burning cable insulation can create corrosive gases, which have an irritant and corrosive effect. When disposing of fire insulation which has been subjected to a fire, wear breathing protection and protective clothing.

If the components of the PYROBAG® system or other parts of the fire insulation have been subjected to fire damage, the complete insulation must be removed and disposed of. We recommend obtaining the advice of a local fire damage restorer during disposal.

Own notes



8 Appendix – declaration of conformity (sample)

Insulation system

Name and address of the company which erected the cable insulation

Building site or building with address

Required fire resistance class

Date of erection

This is confirmation that

- The cable insulation PYROBAG® system, fire resistance classes to EI90, fire resistant, general construction type approval of Deutsches Institut für Bautechnik DIBt Z-19.53-2570, for installation in walls and ceilings up to a fire resistance class of 90 minutes, was correctly made and installed as well as labelled according to all the individual requirements and in compliance with all the requirements of the named proof of usability and
- The building products used to produce the object of the approval (e.g. insulation compounds, mineral fibre plates, frames, etc.) were labelled according to the requirements of the proof of usability.

Place, date

Stamp and signature

This confirmation must be given to the builder for forwarding, if necessary, to the responsible construction supervisory board.



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